



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,242	09/12/2005	Shinya Otsuki	6268-007/NP	8053
27572 7590 04/22/2008 HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 828 BLOOMFIELD HILLS, MI 48303				
EXAMINER AFSHAR, KAMRAN				
ART UNIT		PAPER NUMBER		
2617				
MAIL DATE		DELIVERY MODE		
04/22/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/549,242

Applicant(s)

OTSUKI ET AL.

Examiner

KAMRAN AFSHAR

Art Unit

2617

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09/12/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) See Continuation Sheet is/are allowed.
- 6) ☒ Claim(s) 1, 6/1, 7/1, 12/1, 20, 25/20, 26/20, 28/20 is/are rejected.
- 7) ☒ Claim(s) See Continuation Sheet is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 September 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 09/12/2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Continuation of Disposition of Claims: Claims allowed are 2-3, 6-17/2-3, 4-5, 6-17/4-5, 18-19, 21-24, 25-38/21-24, 42-42/32/20-24 and 37-38 .

Continuation of Disposition of Claims: Claims objected to are 8/1, 9/1, 10/1, 11/1, 14-15/10, 13/1, 39-40/13, 16/1, 17/1, 27/20, 29/20, 33-34/29, 30/20, 31/20, 32/20, 41-42/32, 35/20, 36/20 .

DETAILED ACTION

This action is in response to Preliminary Amendment filed on 09/12/2005.

Drawings

1. Figure 49 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Information Disclosure Statement

2. It is noted all references considered except where line through because no date was provided.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 6/1, 7/1, 12/1, 20, 25/20, 26/20, 28/20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (APA) in view of Hirano (U.S. Pub. No.: 2005/0201314 A1) further in view of Mochizuki (U.S. Pub. No.: 2006/0154628 A1).

With respect to claims 1, 20, APA discloses a wireless packet communication (See APA e.g. Fig. 49) method for transmitting from a transmit-side STA a wireless packet by using a wireless channel

Art Unit: 2617

determined to be idle by both of physical carrier sense and virtual carrier sense when multiple wireless channels are provided between the transmit-side STA and one or more receive-side STAs (See APA, the physical carrier sense determining a wireless channel to be busy or idle from received power (See APA e.g. physical carrier senses the received power of channel, virtual carrier sense, Idle or busy status, wireless packet, Page 1, ¶ [0005]), the virtual carrier sense determining a wireless channel to be busy during a set transmission inhibition time (See APA, e.g. virtual carrier sense NAV = "0" is idle, not being "0" is busy, two wireless channels (or paired channels or adjacent channels), Page 2, ¶ [0006]). However, APA does not teach the method characterized by comprising setting transmission inhibition time to a paired wireless channel by the transmit-side STA, the paired wireless channel being a wireless channel affected by leakage from a transmitting wireless channel, the transmission inhibition time being used in the virtual carrier sense. In an analogous field of endeavor, on one hand Hirano teaches the concept of setting transmission inhibition time to a paired wireless channel by the transmit-side STA (See Hirano e.g. communication setting means 4 of Fig. 1, timing control information of Fig. 1, transmission time IFS, idle time, time to be added, Page 1, ¶ [0009]). Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention to provide above teaching of Hirano to APA to provide a method and or a system such that the idle time and transmission time of header to be added to the data are included (See Hirano e.g. Page 1, Lines 4-5 of ¶ [0009]) and or setting of the longest transmission time of the data relating to continuous data or the maximum capacity of the data is needed for the purpose or power saving (See Hirano e.g. Page ¶ [0106]). On the other hand, Mochizuki teaches the concept of the paired wireless channel being a wireless channel affected by leakage from a transmitting wireless channel (See Mochizuki e.g. local channel, paired (or adjacent) channels of Fig. 1, leakage adjacent channel power, Page 2, Lines 1-4 of ¶ [0024], and Fig. 4). Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention to provide above teaching of Mochizuki to Hirano and APA providing a method and or a system using the carrier sense multiple access method and interference suppression method thereof, and more particularly, to a receiver that can improve the adjacent channel interference characteristic among a plurality of base stations and terminals and interference suppression method thereof as suggested (See Mochizuki e.g. Page 1, ¶ [0001]).

Art Unit: 2617

Regarding claims 6/1, 25/20, it is obvious that further comprising detecting, by the transmit-side STA, received power due to a leakage from a transmitting wireless channel in the paired wireless channel, and setting the transmission inhibition time Hirano e.g. communication setting means 4 of Fig. 1, timing control information of Fig. 1, transmission time IFS, idle time, time to be added, Page 1, ¶ [0009]) to a paired wireless channel which has received power greater than or equal to a predetermined threshold value (See Mochizuki e.g. RSSI detect, comparing carrier sense threshold value, determined to be equal or more than the threshold value, Page 2, Lines 6-12 of ¶ [0021], Fig. 4) or transmit-side STA includes a unit which detects received power (See Mochizuki e.g. RSSI detect, comparing carrier sense threshold value, determined to be equal or more than the threshold value, Page 2, Lines 6-12 of ¶ [0021], Fig. 4).

Regarding claims 7/1, 26/20, it is obvious that further comprising detecting, by said transmit-side STA, an error in a received signal in the paired wireless channel, and setting the transmission inhibition time to a paired wireless channel having the error detected (See Mochizuki e.g. local channel, paired (or adjacent) channels of Fig. 1, leakage adjacent channel power, Page 2, Lines 1-4 of ¶ [0024], and Fig. 4) or the transmit-side STA includes a unit which detects an error in a received signal (See Mochizuki e.g. RSSI detect, comparing carrier sense threshold value, Fig. 4).

Regarding claims 12/1, 28/20, it is obvious that when transmission data is generated, transmitting, by the transmit-side STA (See APA, the physical carrier sense determining a wireless channel to be busy or idle from received power (See APA e.g. physical carrier senses the received power of channel, virtual carrier sense, idle or busy status, wireless packet, Page 1, ¶ [0005]), a wireless packet using the wireless channel determined to be idle after waiting until all wireless channels are determined to be idle by the physical carrier sense and the virtual carrier sense (See APA, e.g. virtual carrier sense NAV = "0" is idle, not being "0" is busy, two wireless channels (or paired channels or adjacent channels), Page 2, ¶ [0006]).

Allowable Subject Matter

5. Claims 2-3, 6-17/2-3, 4-5, 6-17/4-5, 18-19, 21-24, 25-38/21-24, 42-42/32/20-24 and 37-38 are allowed.

The following is an examiner's statement of reasons for allowance: 2-3, 6-17/2-3, 4-5, 6-17/4-5, 18-19, 21-24, 25-38/21-24, 42-42/32/20-24 and 37-38.

With respect to claim 2, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that the method comprising setting, by transmit-side STA, time ($T_{max}+T_s$) as transmission inhibition time to a paired wireless channel other than a wireless channel which requires longest transmission time T_{max} among wireless channels used for simultaneous transmission, the transmission inhibition time used in the virtual carrier sense, the time ($T_{max}+T_s$) obtained by adding predetermined time T_s to the longest transmission time T_{max} .

With respect to claim 4, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that the method comprising: predetermining, by the transmit-side STA, combinations of wireless channels among the multiple wireless channels, the combinations of wireless channels having an effect on each other due to a leakage of transmitted power; and setting, by said transmit-side STA, time (T_i+T_s) as transmission inhibition time to a paired wireless channel other than a wireless channel which requires longest transmission time T_i among respective combinations of wireless channels; the transmission inhibition time being used in the virtual carrier sense, the time (T_i+T_s) obtained by adding a predetermined time T_s to the longest transmission time T_i .

With respect to claim 18, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that the method comprising setting, by the transmit-side STA, time ($T_{max}+T_s$) as transmission inhibition time to sub-channels other than a sub-channel which requires longest transmission/reception time T_{max} among sub-channels used for simultaneous

transmission, the time ($T_{\max}+T_s$) being obtained by adding a predetermined time T_s to the longest transmission/reception time T_{\max} , the transmission inhibition time being used in the virtual carrier sense.

With respect to claim 21, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that the apparatus comprising a virtual carrier sense unit of said transmit-side STA setting time ($T_{\max}+T_s$) as the transmission inhibition time to a paired wireless channel other than a wireless channel which requires longest transmission time T_{\max} among wireless channels used for simultaneous transmission, the time ($T_{\max}+T_s$) obtained by adding the predetermined time T_s to the longest transmission T_{\max} .

With respect to claim 23, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that the apparatus comprising a virtual carrier sense unit of the transmit-side STA predetermining combinations of wireless channels which have an effect of leakage of transmitted power on each other among multiple wireless channels, and setting time (T_i+T_s) as the transmission inhibition time to a paired wireless channel other than a wireless channel which requires longest transmission time T_i among respective combinations of wireless channels, the time (T_i+T_s) obtained by adding a predetermined time T_s to the longest transmission time T_i .

Regarding claim 37, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that comprising: one transceiver which multiplexes a plurality of sub-channels into one wireless channel for transmission and reception; a physical carrier sense unit which determines whether each of the sub-carriers is busy or idle from received power; and a virtual carrier sense unit which determines each of said sub-carriers to be busy during set transmission inhibition time, wherein the transceiver assigns, for simultaneous transmission and reception, a plurality of wireless packets respectively to a plurality of sub-channels determined to be idle by both the physical carrier sense unit and the virtual carrier sense unit, the apparatus characterized in that the virtual carrier sense unit sets time ($T_{\max}+T_s$) as transmission inhibition time to sub-channels

other than a sub-channel which requires longest transmission time T_{max} among sub-channels used for simultaneous transmission and reception, the time ($T_{max}+T_s$) obtained by adding a predetermined time T_s to the longest transmission time T_{max} .

6. Claims 8/1, 9/1, 10/1, 11/1, 14-15/10, 13/1, 39-40/13, 16/1, 17/1, 27/20, 29/20, 33-34/29, 30/20, 31/20, 32/20, 41-42/32, 35/20, 36/20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 8/1, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that further comprising: when receiving a wireless packet over the paired wireless channel at said transmit-side STA, performing, by the transmit-side STA, an error detection to the received wireless packet: when a wireless channel having normally received a wireless packet directed to an own STA has the set transmission inhibition time, canceling the transmission inhibition time by said transmit-side STA; and when occupied time is set in a header of the received wireless packet, setting, by said transmit-side STA, a new transmission inhibition time in accordance with the occupied time.

Regarding claim 9/1, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that further comprising when there is a wireless channel having the set transmission inhibition time at the time of transmission data generation, transmitting, by the transmit-side STA, a wireless packet using the wireless channel determined to be idle after waiting until the transmission inhibition time elapses.

Regarding claim 10/1, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that further comprising: when there are wireless channels having set transmission time at the time of transmission data generation, transmitting, by the transmit-side STA, a wireless packet using said wireless channel determined to be idle after waiting until the transmission inhibition time elapses when the longest transmission inhibition time is smaller than a predetermined threshold value; or transmitting, by the transmit-side STA, a wireless packet using the

wireless channel determined to be idle without waiting until the transmission inhibition time elapses when the longest transmission inhibition time is greater than or equal to the predetermined threshold value.

Regarding claim 11/1, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that further comprising when there is a wireless channel having the set transmission inhibition time at the time of transmission data generation, transmitting, by said transmit-side STA, a wireless packet using the wireless channel determined to be idle with a predetermined probability without waiting until the transmission inhibition time elapses.

Regarding claim 13/1, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that further comprising: when transmission data is generated, transmitting, by said transmit-side STA, wireless packets using the wireless channels determined to be idle after waiting until all wireless channels are determined to be idle by the physical carrier sense and the virtual carrier sense; or transmitting, by the transmit-side STA, wireless packets using the wireless channels determined to be idle without waiting until the transmission inhibition time elapses when the longest transmission inhibition time of the set transmission inhibition time of wireless channels is greater than or equal to a predetermined threshold value.

Regarding claim 16/1, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that further comprising when transmission data is generated, transmitting, by said transmit-side STA, a wireless packet using the wireless channel determined to be idle after waiting or without waiting with a predetermined probability until all wireless channels are determined to be idle by the physical carrier sense and said virtual carrier sense.

Regarding claim 17/1, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that further comprising: when receiving a wireless packet having set transmission inhibition time, setting, by said receive-side STA, the transmission inhibition time to a wireless channel having received the wireless packet, and when normally receiving a wireless packet directed to an own STA, transmitting, by said receive-side STA, an ACK packet to said transmit-side

Art Unit: 2617

STA, the ACK packet including the transmission inhibition time set in the paired wireless channel; and when receiving a corresponding ACK packet within a predetermined period of time after having transmitted said wireless packet, updating, by said transmit-side STA, transmission inhibition time set for the paired wireless channel to transmission inhibition time of the paired wireless channel included in the ACK packet.

Regarding claim 27/20, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that the transmit-side STA includes a unit which detects, when receiving a wireless packet over the paired wireless channel, an error in the received wireless packet; when a wireless channel having normally received a wireless packet directed to an own STA has the set transmission inhibition time, the virtual carrier sense unit cancels the transmission inhibition time; and when occupied time is set in a header of the received wireless packet, the virtual carrier sense unit sets a new transmission inhibition time in accordance with the occupied time.

Regarding claim 29/20, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that when transmission data is generated, when the longest transmission inhibition time of the set transmission inhibition time of wireless channels is smaller than a predetermined threshold value, the virtual carrier sense unit of the transmit-side STA transmits a wireless packet using the wireless channel determined to be idle after waiting until the transmission inhibition time elapses; or when the longest transmission inhibition time is greater than or equal to the predetermined threshold value, the virtual carrier sense unit transmits a wireless packet using the wireless channel determined to be idle without waiting until the transmission inhibition time elapses.

Regarding claim 30/20, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that when there is a wireless channel having the set transmission inhibition time at the time of transmission data generation, the virtual carrier sense unit of the transmit-side STA transmits a wireless packet using the wireless channel determined to be idle, without waiting with a predetermined probability until the transmission inhibition time elapses.

Art Unit: 2617

Regarding claim 31/20, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that when transmission data is generated, the physical carrier sense unit and the virtual carrier sense unit of the transmit-side STA transmit a wireless packet using said wireless channel determined to be idle after waiting until all the wireless channels are determined to be idle.

Regarding claim 32/20, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that when transmission data is generated, the physical carrier sense unit and the virtual carrier sense unit of the transmit-side STA transmit a wireless packet using the wireless channel determined to be idle after waiting until all the wireless channels are determined to be idle; or when the longest transmission inhibition time of the set transmission inhibition time of the wireless channels is greater than or equal to a predetermined threshold value, the physical carrier sense unit and the virtual carrier sense unit transmit a wireless packet using said wireless channel determined to be idle without waiting until the transmission inhibition time elapses.

Regarding claim 35/20, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that when transmission data is generated, the physical carrier sense unit and the virtual carrier sense unit of the transmit-side STA transmit a wireless packet using the wireless channel determined to be idle after waiting or without waiting with a predetermined probability until all the wireless channels are determined to be idle.

Regarding claim 36/20, the prior art of record as discussed above fails to disclose singly or in combination or render obvious that the receive-side STA includes a unit which sets transmission inhibition time to a wireless channel receiving a wireless packet when the received wireless packet has the set transmission inhibition time, and which transmits an ACK packet to said transmit-side STA when a wireless packet directed to the own STA has been normally received, the ACK packet including the transmission inhibition time set in the paired wireless channel; and the transmit-side STA includes a unit which updates the transmission inhibition time set for the paired wireless channel to transmission inhibition time of a paired wireless channel included in a corresponding ACK packet

Art Unit: 2617

when receiving the ACK packet within a predetermined period of time after having transmitted the wireless packet.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
- a) Kelto (U.S. Pub. NO.: 2004/0203382 A1).
 - b) Yung (U.S. 5,870,388 A).
 - c) Angelico (U.S. 6,192,053 B1).
 - d) Nagata (U.S. Pub. No.: 2006/0209874 A1).
 - e) Saito (U. S. Pub. No.: 2006/0109813 A1).

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Kamran Afshar whose telephone number is (571) 272-7796. The examiner can be reached on Monday-Friday.

If attempts to reach the examiner by the telephone are unsuccessful, the examiner's supervisor, **Trost, William** can be reached @ (571) 272-7872. The fax number for the organization where this application or proceeding is assigned is **571-273-8300** for all communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Kamran Afshar 571-272-7796/

Primary Examiner, Art Unit 2617